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perature stimuli are doubtless due to their direct influence on the osmotic action of the cells." [2]

Correns finds that the most various kinds of solutions, so dilute as to cause no injury, call forth in tendrils a typical reaction. Since the cuticle is with difficulty penetrated, rather strong solutions are sometimes necessary to cause the reaction, e. g., iodine solution, 0.00192 %. Even stronger concentrations of other substances cause no injury and call forth the reaction, e. g., acetic acid, 2–6 %; arsenic, 1 %; chloroform, 10 %. Ammonia vapors also cause a plain reaction.

MacDougal found that when tendrils were submersed in solutions of the ordinary metallic salts (no concentrations given), "the induced osmotic action quickly caused curves." Unless penetrated and killed immediately, the tendrils were thrown into coils. [3]

In the case of the chemical stimulus Correns finds that accommodation takes place when the concentration of the solution is gradually increased.

A few experiments with induction currents renders it probable that they too are able to produce reactions similar to those described.

Correns studied the tendrils of Cucurbitaceæ and Passifloræ mainly, but other tendril-bearing forms were not neglected.—Rodney H. True.

The physiology of Drosera rotundifolia.

In his work on *Drosera rotundifolia*, Darwin[4] arrived at the conclusion that the speed with which the tentacles show curvature reactions varies according to the temperature, from 48.8°C. to 51.6°C. being especially favorable.

Dr. Carl Correns[5] regards this conclusion, that a temperature elevation releases irritation movements, to be worthy of further attention since phenomena of this kind are not of common occurrence. When leaves were cut from the plant and placed in distilled water which was brought to the desired temperature, his results agreed with those of Darwin obtained by the same method. When entire plants in the atmosphere were subjected to a rapid or a gradual elevation of the temperature to the limit set by Darwin, no curvature of the tentacles was to be seen. The conduct toward temperature change varies, therefore, according to the nature of the surrounding medium, and causes aside from temperature are operative. He found, in fact, that distilled water at ordinary temperatures acted as a stimulus, and in a slight measure, the temperature elevation hastened and strengthened the reaction. From ecological considerations this conclusion is surprising. Distilled water prepared with the utmost care gave the same result, impurities being, therefore, in no way responsible.

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[2] Bot. Gaz. **18:** 125. 1893.

[3] Bot. Gaz. **17:** 207. 1892.

[4] Darwin. Insectivorous Plants 66. 1875. [Ed. I.]

[5] Carl Correns, Bot. Zeit. **54:** 21–26. 1896.

To test Darwin's statement that leaves react more rapidly at higher temperatures, Correns used as irritants dilute solutions of sodium chloride (1:8400), sodium nitrate (1:840) and acetic acid (1:333) at two temperatures, 18 to 21° C. and 48 to 52° C. He found that the strength and speed of the reaction of Drosera leaves to chemical stimuli is increased by an elevation of temperature.

Water from the Tübingen water works undistilled, caused no reaction, leading to the conclusion that impurities were responsible, not for the reaction, but for the absence of reaction, to water. When this water was distilled, a reaction followed. By adding to pure distilled water pulverized calcium carbonate in the presence of carbonic acid, no reaction followed. Calcium phosphate and calcium nitrate behaved in a like manner. We have, therefore, in the calcium salts, substances which, like ether, make Drosera leaves insensitive to chemical stimuli. This fact was known to Darwin.

The author found that 0.1% calcium nitrate entirely prevents any reaction; 0.02% still exerts a noticeable influence; 0.01% is without apparent effect.

Drosera leaves seem to react in an especially pronounced manner to ammonium carbonate in dilute solution (0.05%). A comparison of effectiveness in their specific directions of calcium nitrate and of ammonium carbonate showed that from five to ten parts of the former are necessary to physiologically balance one part of the latter.

The growth habits of *Drosera rotundifolia* stand in accord with the above results since this plant with its companions, the sphagna, are found only in soils poor in lime. Cultures of Drosera watered with hard water quickly die.—RODNEY H. TRUE.